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EXAMINER	
ZERVIGON, RUDY	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/036,067	MADOCKS, JOHN E.
	Examiner	Art Unit
	Rudy Zervigon	1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 June 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. In view of the Appeal Brief filed on June 14, 2004, PROSECUTION IS HEREBY REOPENED. A new ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-23, and 26-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Flemming (USPat. 3,955,118). Flemming teaches a plasma (20, 33; Figure 1; column 1, lines 10-40; column 2, lines 60-65) treatment apparatus (Figure 1; column 1, lines 10-40), comprising: at least first (13; Figure 1; column 2, lines 50-65) and second (12; Figure 1; column 2, lines 50-65) cathodes separated by a gap (distance between upper surface of 13 and lower surface of 12), said first (13; Figure 1; column 2, lines 50-65) cathode comprising a first exposed cathode surface

(top surface of 13; Figure 1; column 2, lines 50-65) and a first magnetic polarity – When the structure recited in the references is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. MPEP 2112.01. In comparing Applicant's components of Figure 5, for example, with the corresponding components of Flemming's Figure 1 as discussed below, the claimed property of "a first magnetic polarity" is inherent.

Flemming further teaches said second (12; Figure 1; column 2, lines 50-65) cathode comprising a second exposed cathode surface (top surface of 12; Figure 1; column 2, lines 50-65) and a second magnetic polarity – As discussed above, when the structure recited in the references is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. MPEP 2112.01. In comparing Applicant's components of Figure 5, for example, with the corresponding components of Flemming's Figure 1 as discussed below, the claimed property of "second magnetic polarity" is inherent.

Flemming further teaches said first exposed cathode surface (top surface of 13; Figure 1; column 2, lines 50-65) oriented non-parallel (see conical portion of 13; Figure 1) to said second exposed cathode surface (top surface of 12; Figure 1; column 2, lines 50-65); a set of magnets (Applicant's specification requires "a set of magnets can include 1, 2, 3 or more magnets." page 29, lines 25-26) and reads on Flemming's single coil electromagnet (14; Figure 1; column 2, lines 50-65; column 3, lines 25-26) operative to generate a magnetic field exiting from one of the cathodes and entering the other of the cathodes – As discussed above, when the structure recited in the references is substantially identical to that of the claims, claimed properties or functions

are presumed to be inherent. MPEP 2112.01. In comparing Applicant's components of Figure 5, for example, with the corresponding components of Flemming's Figure 1 as discussed below, the claimed property of "to generate a magnetic field exiting from one of the cathodes and entering the other of the cathodes" is inherent.

Flemming further teaches that said magnetic field exiting from one of the cathodes and entering the other of the cathodes thereby crosses the gap (distance between upper surface of 13 and lower surface of 12); said magnetic field comprising a first magnetic field portion crossing the gap (distance between upper surface of 13 and lower surface of 12) and passing through said first exposed cathode surface (top surface of 13; Figure 1; column 2, lines 50-65) – As discussed above, when the structure recited in the references is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. MPEP 2112.01. In comparing Applicant's components of Figure 5, for example, with the corresponding components of Flemming's Figure 1 as discussed below, the claimed property of "first magnetic field portion", or, as is known in the art, magnetic field lines is inherent although not shown by Flemming.

Flemming further teaches at least one anode structure (52; Figure 1, 3; column 4, lines 21-24 - "used in place of anode 11") positioned to create an electric field extending from the cathodes to the anode structure (52; Figure 1, 3; column 4, lines 21-24 - "used in place of anode 11"), at least a portion of said electric field crossing said magnetic field and forming a closed-loop electron containment region within said magnetic field – As discussed above, when the structure recited in the references is substantially identical to that of the claims, claimed properties or functions

are presumed to be inherent. MPEP 2112.01. In comparing Applicant's components of Figure 5, for example, with the corresponding components of Flemming's Figure 1 as discussed below, the claimed property of "a closed-loop electron containment region within said magnetic field" is inherent.

Flemming further teaches a sufficient voltage (24; Figure 1) between the anode structure (52; Figure 1, 3; column 4, lines 21-24 - "used in place of anode 11") and the cathodes operative to form a plasma (20, 33; Figure 1; column 1, lines 10-40; column 2, lines 60-65) within the magnetic field when a gas (fed through 21; Figure 1) is present near the containment region; and at least one substrate ("semiconductor devices"; column 1, lines 10-20) positioned to be treated by said plasma (20, 33; Figure 1; column 1, lines 10-40; column 2, lines 60-65).

Flemming further teaches:

i. The apparatus of claim 1 wherein the substrate ("semiconductor devices"; column 1, lines 10-20) is positioned to be treated by the plasma (20, 33; Figure 1; column 1, lines 10-40; column 2, lines 60-65) with a treatment selected from the group consisting of: a chemical vapor deposition process, a surface modification process ("ion implantation"; column 1, lines 10-15, 43-50), an etching process, a sputter-coating process, and combinations thereof, as claimed by claim 2

ii. The apparatus of claim 1 wherein the magnetic field comprises a mirror-type magnetic field at least in a peripheral portion of the magnetic field, as claimed by claim 3 – Compare Applicant's magnetic field (111; Figure 5) with the magentic field generating

structures of Flemming already recited (Figure 1) – As discussed above, when the structure recited in the references is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. MPEP 2112.01. In comparing Applicant's components of Figure 5, for example, with the corresponding components of Flemming's Figure 1 as discussed below, the claimed property of "a closed-loop electron containment region within said magnetic field" is inherent.

iii. The apparatus of claim 1 wherein the first exposed cathode surface (top surface of 13; Figure 1; column 2, lines 50-65) faces the substrate ("semiconductor devices"; column 1, lines 10-20), as claimed by claim 4 – This is a requisite property due to the propulsion direction of the plasma (33; Figure 1).

iv. The apparatus of claim 1 wherein at least one of the cathodes (13; Figure 1; column 2, lines 50-65) comprises a non-planar cathode surface (top conical surface of 13; Figure 1; column 2, lines 50-65), as claimed by claim 6

v. The apparatus of claim 6 wherein at least one of the cathodes (13; Figure 1; column 2, lines 50-65) comprises a facing cathode surface (top conical surface of 13; Figure 1; column 2, lines 50-65) having a shape selected from the group consisting of: a point, a bevel (top conical surface of 13; Figure 1; column 2, lines 50-65), a rounded surface (top conical surface of 13; Figure 1; column 2, lines 50-65), a stepped surface, a ridged surface, and combinations thereof, as claimed by claim 7

vi. The apparatus of claim 1 wherein the cathodes (12, 13; Figure 1; column 2, lines 50-65) comprise ends and a central portion (22; Figure 1), and wherein the cathodes are shaped such that the gap (distance between upper surface of 13 and lower surface of 12) is wider

at the ends than at the central portion – conical portion of 13, Figure 1, as claimed by claim 11

vii. The apparatus of claim 1 wherein the electron containment region (Applicant's 115; Figure 5) is centered in a plane that is oriented perpendicular (+- 45°) to a portion of the substrate ("semiconductor devices"; column 1, lines 10-20) adjacent to the gap (distance between upper surface of 13 and lower surface of 12), as claimed by claim 15 – Applicant's electron containment region (115; Figure 5), as claimed, is indistinguishable from Flemming's electron containment region (33; Figure 1).

viii. 16.A plasma (20, 33; Figure 1; column 1, lines 10-40; column 2, lines 60-65) treatment apparatus (Figure 1; column 1, lines 10-40), comprising: at least first (13; Figure 1; column 2, lines 50-65) and second (12; Figure 1; column 2, lines 50-65) cathodes separated by a gap (distance between upper surface of 13 and lower surface of 12), said first (13; Figure 1; column 2, lines 50-65) cathode comprising a first magnetic polarity (resulting from magnetic flux from electromagnet 14), and said second (12; Figure 1; column 2, lines 50-65) cathode comprising a second magnetic polarity (resulting from magnetic flux from electromagnet 14); a set of magnets (Applicant's specification requires "a set of magnets can include 1, 2, 3 or more magnets." page 29, lines 25-26) and reads on Flemming's single coil electromagnet (14; Figure 1; column 2, lines 50-65; column 3, lines 25-26) operative to generate a magnetic field exiting from one of the cathodes and entering the other of the cathodes, thereby crossing the gap (distance between upper surface of 13 and lower surface of 12); at least one anode structure (52; Figure 1, 3; column 4, lines 21-24 - "used in place of anode 11") positioned to create an

electric field extending from the cathodes to the anode structure (52; Figure 1, 3; column 4, lines 21-24 - "used in place of anode 11"), at least a portion of said electric field crossing said magnetic field and forming a closed-loop electron containment region within said magnetic field, claim 16 – As discussed above, when the structure recited in the references is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. MPEP 2112.01. In comparing Applicant's components of Figure 5, for example, with the corresponding components of Flemming's Figure 1 as discussed below, the claimed property of "a closed-loop electron containment region within said magnetic field" is inherent.

ix. a sufficient voltage (24; Figure 1) between the anode structure (52; Figure 1, 3; column 4, lines 21-24 - "used in place of anode 11") and the cathodes operative to form a plasma (20, 33; Figure 1; column 1, lines 10-40; column 2, lines 60-65) within the magnetic field when a gas (fed through 21; Figure 1) is present near the containment region; and at least one substrate ("semiconductor devices"; column 1, lines 10-20) positioned to be treated by said plasma (20, 33; Figure 1; column 1, lines 10-40; column 2, lines 60-65); and wherein the electron containment region extends farther away from the central axis (along 25; Figure 1) on one side (33; Figure 1) of the gap (distance between upper surface of 13 and lower surface of 12) than on the other side of the gap (distance between upper surface of 13 and lower surface of 12) – claim 16

x. The apparatus of claim 16 wherein the substrate ("semiconductor devices"; column 1, lines 10-20) is positioned on said one side of the gap (distance between upper surface of 13 and lower surface of 12), as claimed by claim 17 – That the "semiconductor devices"

are downstream of Flemming's plasma source is inherent as it lends to the intended operation of Flemming's plasma source.

xi. a plasma (20, 33; Figure 1; column 1, lines 10-40; column 2, lines 60-65) treatment apparatus (Figure 1; column 1, lines 10-40), comprising:at least first (13; Figure 1; column 2, lines 50-65) and second (12; Figure 1; column 2, lines 50-65) cathodes separated by a gap (distance between upper surface of 13 and lower surface of 12), said first (13; Figure 1; column 2, lines 50-65) cathode comprising a first magnetic polarity (resulting from magnetic flux from electromagnet 14), and said second (12; Figure 1; column 2, lines 50-65) cathode comprising a second magnetic polarity (resulting from magnetic flux from electromagnet 14); a set of magnets (Applicant's specification requires "a set of magnets can include 1, 2, 3 or more magnets." page 29, lines 25-26) and reads on Flemming's single coil electromagnet (14; Figure 1; column 2, lines 50-65; column 3, lines 25-26) operative to generate a magnetic field exiting from one of the cathodes and entering the other of the cathodes, thereby crossing the gap (distance between upper surface of 13 and lower surface of 12); at least one anode structure (52; Figure 1, 3; column 4, lines 21-24 - "used in place of anode 11") positioned to create an electric field extending from the cathodes to the anode structure (52; Figure 1, 3; column 4, lines 21-24 - "used in place of anode 11"), at least a portion of said electric field crossing said magnetic field and forming a closed-loop electron containment region within said magnetic field – As discussed above, when the structure recited in the references is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. MPEP 2112.01. In comparing Applicant's components of

Figure 5, for example, with the corresponding components of Flemming's Figure 1 as discussed below, the claimed property of "a closed-loop electron containment region within said magnetic field" is inherent – claim 18

xii. a sufficient voltage (24; Figure 1) between the anode structure (52; Figure 1, 3; column 4, lines 21-24 - "used in place of anode 11") and the cathodes operative to form a plasma (20, 33; Figure 1; column 1, lines 10-40; column 2, lines 60-65) within the magnetic field when a gas (fed through 21; Figure 1) is present near the containment region; at least one substrate ("semiconductor devices"; column 1, lines 10-20) positioned to be treated by said plasma (20, 33; Figure 1; column 1, lines 10-40; column 2, lines 60-65); and a set of ferromagnetic elements ("soft iron"; column 3, lines 24-26) magnetically coupled to the set of magnets to provide a ferromagnetic return magnetic path, thereby enhancing the magnetic field across the gap (distance between upper surface of 13 and lower surface of 12) – claim 18

xiii. The apparatus of claim 18 wherein the electron containment region comprises first (33; Figure 1; column 3; lines 30-44) and second (20; Figure 1; column 2; lines 60-65) portions situated on respective sides of the gap (distance between upper surface of 13 and lower surface of 12), and wherein the second (20; Figure 1; column 2; lines 60-65) is situated between the gap (distance between upper surface of 13 and lower surface of 12) and at least one element selected from the group consisting of: the set of magnets (Applicant's specification requires "a set of magnets can include 1, 2, 3 or more magnets." page 29, lines 25-26) and reads on Flemming's single coil electromagnet (14;

Figure 1; column 2, lines 50-65; column 3, lines 25-26), and the set of ferromagnetic elements ("soft iron"; column 3, lines 24-26), as claimed by claim 19

xiv. The apparatus of claim 18 wherein the set of magnets (Applicant's specification requires "a set of magnets can include 1, 2, 3 or more magnets." page 29, lines 25-26) and reads on Flemming's single coil electromagnet (14; Figure 1; column 2, lines 50-65; column 3, lines 25-26) and the set of ferromagnetic elements ("soft iron"; column 3, lines 24-26) are included in a magnetic circuit (14), and wherein the gap (distance between upper surface of 13 and lower surface of 12) is the largest non-ferromagnetic opening in the magnetic circuit, as claimed by claim 20

xv. 21.A plasma (20, 33; Figure 1; column 1, lines 10-40; column 2, lines 60-65) treatment apparatus (Figure 1; column 1, lines 10-40), comprising: at least first (13; Figure 1; column 2, lines 50-65) and second (12; Figure 1; column 2, lines 50-65) cathodes separated by a gap (distance between upper surface of 13 and lower surface of 12), said first (13; Figure 1; column 2, lines 50-65) cathode comprising a first magnetic polarity (resulting from magnetic flux from electromagnet 14), and said second (12; Figure 1; column 2, lines 50-65) cathode comprising a second magnetic polarity (resulting from magnetic flux from electromagnet 14); a set of magnets (Applicant's specification requires "a set of magnets can include 1, 2, 3 or more magnets." page 29, lines 25-26) and reads on Flemming's single coil electromagnet (14; Figure 1; column 2, lines 50-65; column 3, lines 25-26) operative to generate a magnetic field exiting from one of the cathodes and entering the other of the cathodes, claim 21 - When the structure recited in

the references is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. MPEP 2112.01

xvi. the magnetic field exiting from one of the cathodes and entering the other of the cathodes thereby crossing the gap (distance between upper surface of 13 and lower surface of 12); at least one anode structure (52; Figure 1, 3; column 4, lines 21-24 - "used in place of anode 11") positioned to create an electric field extending from the cathodes to the anode structure (52; Figure 1, 3; column 4, lines 21-24 - "used in place of anode 11"), at least a portion of said electric field crossing said magnetic field and forming a closed-loop electron containment region within said magnetic field – As discussed above, when the structure recited in the references is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. MPEP 2112.01. In comparing Applicant's components of Figure 5, for example, with the corresponding components of Flemming's Figure 1 as discussed below, the claimed property of "a closed-loop electron containment region within said magnetic field" is inherent. containment region within said magnetic field, a sufficient voltage (24; Figure 1) between the anode structure (52; Figure 1, 3; column 4, lines 21-24 - "used in place of anode 11") and the cathodes operative to form a plasma (20, 33; Figure 1; column 1, lines 10-40; column 2, lines 60-65) within the magnetic field when a gas (fed through 21; Figure 1) is present near the containment region; at least one substrate ("semiconductor devices"; column 1, lines 10-20) positioned to be treated by said plasma (20, 33; Figure 1; column 1, lines 10-40; column 2, lines 60-65); an enclosure (15; Figure 1) extending from the cathodes around a portion of the electron containment region positioned away from the substrate

("semiconductor devices"; column 1, lines 10-20); and a source of process gas (fed through 21; Figure 1) positioned within the enclosure – claim 21

xvii. The apparatus of claim 21 wherein a major portion of the process gas (fed through 21; Figure 1) from the source passes through the plasma (20, 33; Figure 1; column 1, lines 10-40; column 2, lines 60-65) containment region in leaving the enclosure (15; Figure 1), as claimed by claim 22

xviii. The apparatus of claim 21 wherein the source of process gas (fed through 21; Figure 1) comprises a tube (20; Figure 1) positioned within the enclosure (15; Figure 1), said tube (20; Figure 1) comprising gas (fed through 21; Figure 1)-release openings (42; Figure 1), as claimed by claim 23

xix. The apparatus of claim 21 wherein the source is positioned between the enclosure (15; Figure 1) and a portion of the electron containment region, as claimed by claim 26

xx. The apparatus of claims 1, 16, 18 or 21 wherein the cathodes (13, 12; Figure 1; column 2, lines 50-65) comprise removable shells – cathodes 13, 12 are not shown as attached in Figure 1, as claimed by claim 27

xxi. The apparatus of claims 1, 16, 18 or 21 wherein the set of magnets comprises an electromagnet (14; Figure 1; column 2, lines 50-65; column 3, lines 25-26), as claimed by claim 31

xxii. cathode (13; Figure 1; column 2, lines 50-65) comprises a plurality of segments (22 level, 13 upper level; Figure 1) positioned adjacent to one another along the length axis, as claimed by claim 32

Flemming does not teach:

i. first magnetic field portion comprising magnetic field lines having a maximum field strength of at least 100 Gauss – claim 1

ii. a gas pressure between 0.1 and 100 mTorr – claim 1, 16, 18, 21

iii. The apparatus of claim 4 wherein the first exposed cathode surface (top surface of 13; Figure 1; column 2, lines 50-65) extends over a length measured along the gap (distance between upper surface of 13 and lower surface of 12) and a width measured transverse to the length, and wherein the width is at least 1 cm, as claimed by claim 5

iv. The apparatus of claim 1 wherein the first (13; Figure 1; column 2, lines 50-65) cathode comprises a facing cathode surface oriented to face the second (12; Figure 1; column 2, lines 50-65) cathode, wherein the first exposed cathode surface (top surface of 13; Figure 1; column 2, lines 50-65) has a length extending along the gap (distance between upper surface of 13 and lower surface of 12) and width W1 measured transverse to the length, wherein the facing cathode surface has a width W2 measured transverse to the length, and wherein W1/W2 is no less than 0.2, as claimed by claim 8

v. The apparatus of claim 8 wherein the length is greater than the width W2, as claimed by claim 9

vi. The apparatus of claim 8 wherein the width W1 is no less than 1 cm, as claimed by claim 10

vii. The apparatus of claim 11 wherein the ends of the cathodes are beveled, as claimed by claim 12

viii. The apparatus of claim 1 wherein the magnetic field comprises a maximum strength magnetic field line, wherein the maximum strength magnetic field line has a maximum

magnetic field strength B1 adjacent one of the cathodes and a minimum magnetic field strength B2 at a central portion of the gap (distance between upper surface of 13 and lower surface of 12), and wherein B1/B2 is greater than 2, as claimed by claim 13

ix. The apparatus of claim 13 wherein B1/B2 is greater than 4, as claimed by claim 14

x. the magnetic field is asymmetrical with respect to a central axis (along 25; Figure 1) of the gap (distance between upper surface of 13 and lower surface of 12) extending between the cathodes – claim 16

xi. The apparatus of claims 1, 18 or 21 wherein the magnetic field is asymmetrical with respect to a central axis (along 25; Figure 1) of the gap (distance between upper surface of 13 and lower surface of 12) extending between the cathodes, and wherein the electron containment region extends farther from the central axis (along 25; Figure 1) on a front side of the gap (distance between upper surface of 13 and lower surface of 12) facing the substrate ("semiconductor devices"; column 1, lines 10-20) than on a back side of the gap (distance between upper surface of 13 and lower surface of 12) facing away from the substrate ("semiconductor devices"; column 1, lines 10-20), as claimed by claim 28

xii. The apparatus of claims 1, 16, 18 or 21 wherein the cathodes are asymmetrical with respect to a central axis (along 25; Figure 1) of the gap (distance between upper surface of 13 and lower surface of 12), as claimed by claim 29

xiii. The apparatus of claims 1, 16, 18 or 21 wherein the set of magnets comprises a permanent magnet, as claimed by claim 30

xiv. The apparatus of claims 1 or 18 wherein the at least one substrate ("semiconductor devices"; column 1, lines 10-20) is positioned on both sides of the gap (distance between

upper surface of 13 and lower surface of 12) for treatment by the plasma (20, 33; Figure 1; column 1, lines 10-40; column 2, lines 60-65), as claimed by claim 33

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Flemming to optimize his magnetic field characteristics, gas flow rate, and apparatus dimension.

Motivation for Flemming to optimize his magnetic field characteristics, gas flow rate, and apparatus dimension is to contain and control Flemming's plasma discharge both magnetically (column 2; lines 60-65;) and electrically (column 3; lines 30-35) as taught by Flemming.

4. Claims 24, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Flemming (USPat. 3,955,118) in view of Bergmann, Erich (US 5,413,684 A). Flemming is discussed above. Flemming does not teach:

i. The apparatus of claim 21 wherein the source of process gas (fed through 21; Figure 1) comprises an evaporation source, as claimed by claim 24

ii. The apparatus of claim 21 wherein the source of process gas (fed through 21; Figure 1) comprises a sputter source, as claimed by claim 25

Bergmann teaches both an evaporation source (5; Figure 1) and a sputter source (1; Figure 1) in a deposition apparatus (Figure 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Flemming to add Bergmann's evaporation source and sputter source.

Motivation for Flemming to add Bergmann's evaporation source and sputter source is to regulate processing reactions as taught by Bergman (column 1, lines 13-18).

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (571) 272-1439.